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E. W. Allen.

SCIENTIFIC BOOKS.

The American Natural History, A Foundation of Useful Knowledge of the Higher Animals of North America. By William T. Hornaday. New York, Charles Scribner's Sons. 1904. 8vo. Pp. xxv + 449.

The object of this book is to make nature available to laymen; it is also particularly addressed to teachers and parents. It is intended to be plain, practical and direct, as well as systematic and scientific. The author has evidently striven (generally with good effect) to make his exposition simple and lucid, his diagrams and synopses mnemonic, his illustrations life-like, his style lively and personal. He has a proper abhorrence of mere closet naturalists as such, and much of the information presented he has won at first-hand during many years' experience as a field naturalist in America and the far east, and as director of the New York Zoological Park. Accordingly, we find here much practical and economic zoology, invaluable matter on the extinction of American species, and the setting right of many ancient and silly myths. As the field covered includes all the principal types of vertebrates found in North America, it is not to be wondered at that slips are to be detected here and there; and in regard to the author's ideas on classification we shall offer a few criticisms.

Clear exposition is exhibited in many sections of the book, notably in the chapter on the rodents. The genera and species are sketched in a manner that should be easily intelligible to the layman and useful to the general zoologist. The chapter dealing with the ruminants is also noteworthy. There are numerous excellent synopses arranged in brackets, and for each class of vertebrates there is a chart of the different orders. Admirable charts show the distribution of mountain sheep, elk, etc., and a convenient map of North America appears on the inner back cover.

The drawings, while of uneven merit, are full of life and action and have good teaching value. Many of them, as, for example that which represents the harpooning of a twenty-foot eagle ray, will surely arouse the enthusiasm of young readers.

Certain groups, *e. g.*, the ducks, are illustrated with great fullness. There are many photographs from life, among those of especial merit being the well-known photograph by Umlauff of an old male gorilla, the photograph by Professor Nathorst of a herd of wild musk oxen, the photographs of the white-tailed deer, bison, owls, pelicans, flamingos, condors, etc., and several of crocodiles; a most remarkable one is that by Beck showing a great multitude of the marine iguanas of the Galapagos gathered together on a rocky shore. There are excellent photographs of the principal snakes; and among Amphibians one photograph shows the northern tree frog with the vocal sack protruded.

The author aims to amuse as well as to instruct, as shown in the following typical passage:

> Whenever you see a brown-coated burrowing animal, the length of a small rat, but twice as thick, with a big pouch in the skin of each cheek, a swinish appetite, a set of long claws like burglars' tools on each fore foot and a most villainous countenance and temper you may know that it is a pocket gopher. The pockets in his cheeks are to enable him to carry extra large quantities of stolen potatoes and seeds.

It is regrettable that in the endeavor to be popular the author repeatedly ascribes human characteristics to those animals, such as pikes, for example, which, so far as we know, are utterly unlike man in their psychic constitution. The same straining for popularity also leads in a number of passages to sensationalism and 'rhetoric.'

Of the author's numerous first-hand observations of great value we may cite only the following:

An alligator seized a fighting enemy by one leg, and using his tail as a propeller, whirled himself round and round like a revolving shaft, until in about five seconds the leg was twisted off, close up to the body!

Very noteworthy is the incident of the entombed live frogs in Ceylon, which were dug up in the dry bed of what in wet weather was a shallow brook.

Of melancholy interest are the full accounts of the extinction of the bison, and of other species of birds and mammals, and of the threatened extinction of the mountain sheep, bighorn, antelope, etc., for the preservation of which the author gives practical suggestions. Fishing and the fishery industries receive considerable attention.

Many popular fallacies and myths are set right. Bats never 'get in your hair.' Certain bats, birds and rodents suspected of injuring the farmer are shown to be his best friends. The gila monster is not ferocious and its bite is not necessarily fatal. No snakes are slimy; the tongue of a snake is never capable of inflicting a wound or conveying poison. Rattle snakes add more than one joint a year to their rattles. The gavial and mugger crocodiles of India are harmless to man, and so are the American crocodiles and alligators.

Of the errors, misstatements, misinterpretations and omissions observed we may note the following: The 'Missing Link' question is discussed, without any reference to the *Pithecanthropus erectus*. Now, whatever may be thought of this remarkable fossil, it should at least have been mentioned. The flippers of the manatee are described as 'well-nigh useless,' except to a limited extent in assisting to convey the food to the mouth. But the manatees in the New York Aquarium may be seen any day using their flippers to good effect in swimming about leisurely. The manatee is further said to be compelled to live on aquatic plants because its molar teeth are weak—but this is probably 'putting the cart before the horse.' The unique horizontal action of the upper lip of the manatee when pulling food into the mouth is not mentioned. Good opportunities to teach the very simplest and most interesting facts of comparative anatomy are neglected. For example, it is nowhere pointed out that birds' wings are modified reptilian hands, bearing long feathers—a fact which might easily have been mentioned in the references to *Archæopteryx*—that in the several groups of aquatic mammals the flippers represent modified hands and feet; that in hoofed mammals, for purposes of speed, etc., the ancient five-toed foot has been, as it were, made over and cut down into the odd-toed and the even-toed types (the use of the term 'divided hoofs' simply confirms a common misconception); that the hoofs of ungulates are really highly improved nails, etc.

The female kangaroo is stated to transfer the young at birth to her pouch by means of her paws instead of by her lips as stated by Owen and other observers. The monotremes are regarded (p. 359) as bridging over the chasm between the classes of birds and mammals, a thoroughly discredited notion. The African ostrich is described as a worthy *descendant* of the moa. *Apteryx* is stated to be 'absolutely without wings,' although Owen, T. J. Parker and Pycraft have all described the wings in great detail; the wings are vestigial, it is true, but they retain an elaborate musculature, spiny remiges and an alar claw. The gills of *Ceratodus* (p. 381) are stated to be small and imperfect and 'of little use.' But this is quite contrary to the observations of Semon.*

Throughout the book a curiously artificial importance is placed upon so-called 'zoological rank,' whether 'high' or 'low.' The Cetacea (perhaps the most complexly organized of mammals) are considered to be 'low' because they lack hair and are fish-like in form. The Dipnoi, we are told, are the 'highest' among fishes because most like amphibians; the eels are very low *because* they lack scales and paired fins!

In classification the author apparently does not trouble himself to distinguish similarities due to analogous, parallel or convergent evolution from similarities due to blood kinship.

* 'In the Australian Bush,' pp. 92, 93.

Thus he finds it convenient to separate probably related groups such as the Pinnipedia and the Carnivora, *Polyodon* and the sturgeons, but, on the other hand, he thinks the orders Anseres, Steganopodes, Tubinares, Longirostres, Pygopodes, Impennes 'might well stand as a subclass—the web-footed swimmers.' Whatever mnemonic value there may be in his classification of the fishes (which is based chiefly upon visible external characters), it must be admitted that the scheme is arbitrary, not expressive of kinships and far from representing the present state of ichthyology. The physostomous and physoclistous orders are scattered about indiscriminately the electric eel (*Symbranchus,* which is almost certainly an eel-like offshoot of the characines) is cited as a typical example of the order Apodes; the Pediculates are widely separated from the spiny-finned group and placed next to the 'foot of the subclass of bony fishes,' which place of slight esteem is assigned to the eels and *to the sea-horse group!*

W. K. Gregory.

SCIENTIFIC JOURNALS AND ARTICLES.

The February number of the *Botanical Gazette* contains 'The theory of respiration,' by C. R. Barnes, being an address as retiring president of the Botanical Society of America, and published also in Science of February 17. —H. N. Whitford has begun a discussion of the forests of Flathead Valley, Montana, being the results of his work as a collaborator in the U. S. Bureau of Forestry. The paper discusses the conditions that determine the appearance and nature of the forests of that region, and inferentially the nature of the conditions of forest development in other regions.—Theo. Holm publishes a study of *Munroa squarrosa,* both from the standpoint of its general characters and its anatomy.—C. J. Chamberlain presents the view of a botanist as to alternation of generations in animals, his theory being that the egg with the three polar bodies constitutes a generation comparable with the female gametophyte in plants; that the primary spermatocyte with the four spermatozoa constitute a generation comparable with the male gametophyte in plants; and that all other cells in the animal constitute a generation comparable with the sporophyte in plants. His lines of evidence are the gradual reduction of the gametophyte in plants, with the constantly diminishing interval between the reduction of chromosomes and the process of fertilization; and the phenomena of chromatin reduction in both animals and plants.—W. F. Ganong, in continuing his descriptions of new precision-appliances for use in plant physiology, describes an autographic transpirometer, an adjustable leaf clasp, and a leaf-area cutter.

The February number of the *Journal of Nervous and Mental Disease* opens with an article by Dr. Morton Prince, of Boston, on the course of the sensory fibers in the spinal cord as evidenced by a case of section of the cord. Dr. Prince discusses the function of the posterior columns with a leaning toward the view that they are largely for the conduction of muscular rather than tactile sense, and that at least one of the paths of conduction of tactile sense is in the lateral part of the cord. He goes over the reports of various experiments on animals, and then presents very carefully the case in point, resulting from a brawl between a couple of Italians and amounting practically to a vivisection experiment on a human being. Lack of space prevents giving his conclusions in full, but among them might be noted: It is proved that tactile sensations are conducted by other paths than the posterior columns, and this is probably although not positively true of pain as well. A path for sensibility must cross the cord. In the second article Dr. Frank R. Fry, of St. Louis, reports two cases of syphilitic disease of the cervical spine, belonging to a type characterized by a stiff neck with one or more points of tenderness on deep pressure, severe neuralgic pains, often not sharply localizable, no objective sensory changes, and no paralysis. Dr. F. X. Dercum, of Philadelphia, reports a case of trauma of the foot of the second frontal convolution, followed by ataxia, nystagmus and epilepsy, which improved after surgical interference. The October meeting of the Philadelphia Neurological Society and the November meeting of the New York Neuro-